

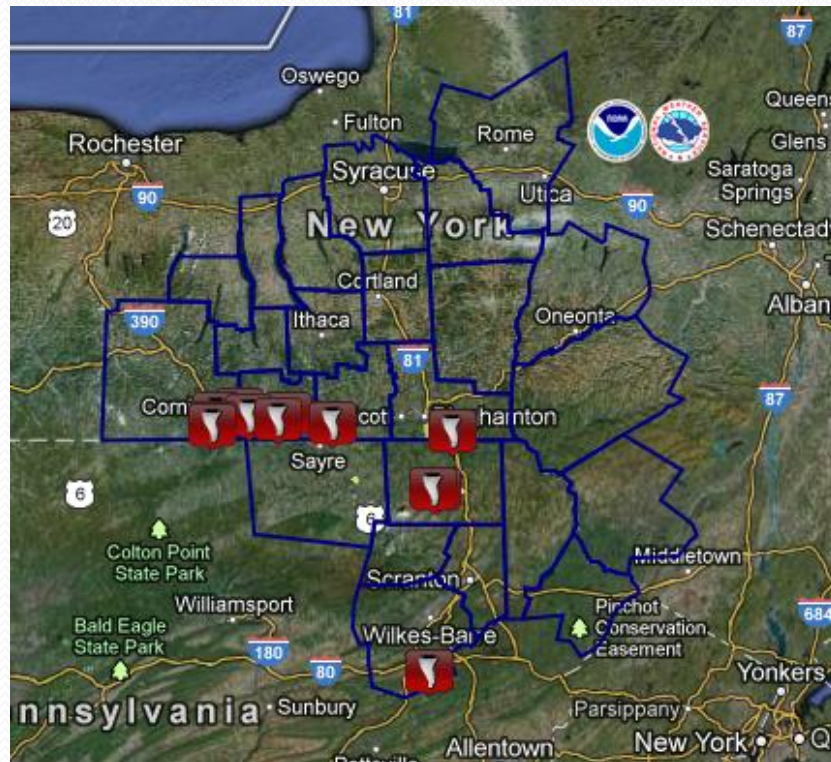
The 26 July, 2012 Twin Tier severe weather and tornado outbreak:

Part I : environmental characteristics

Mike Evans, WFO Binghamton, NY

Background

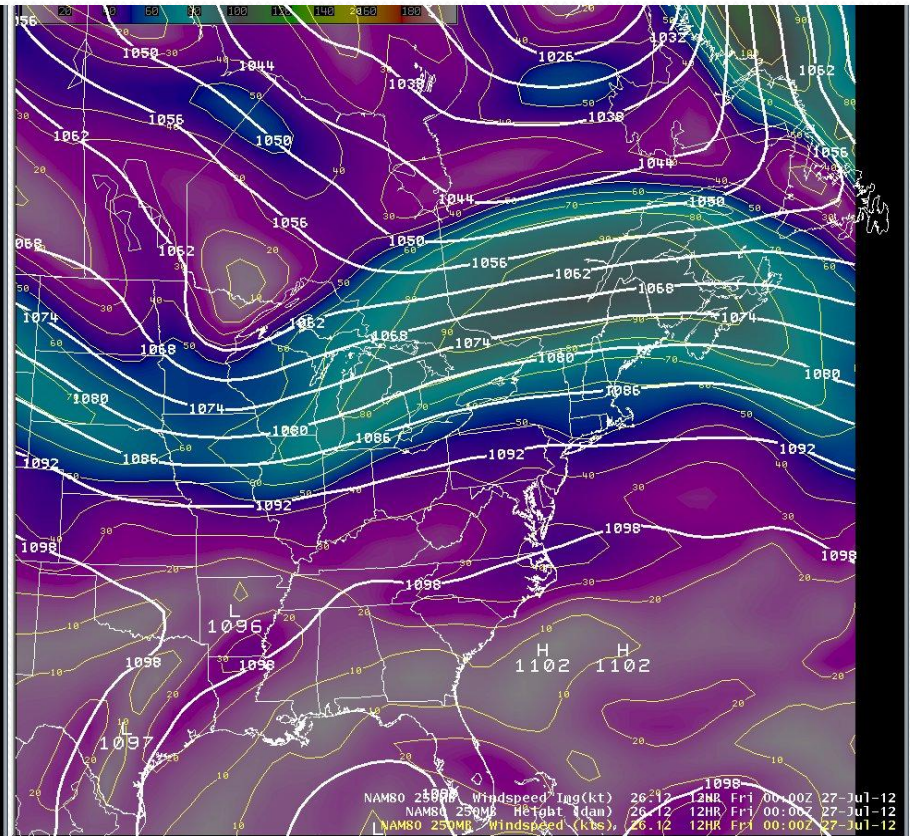
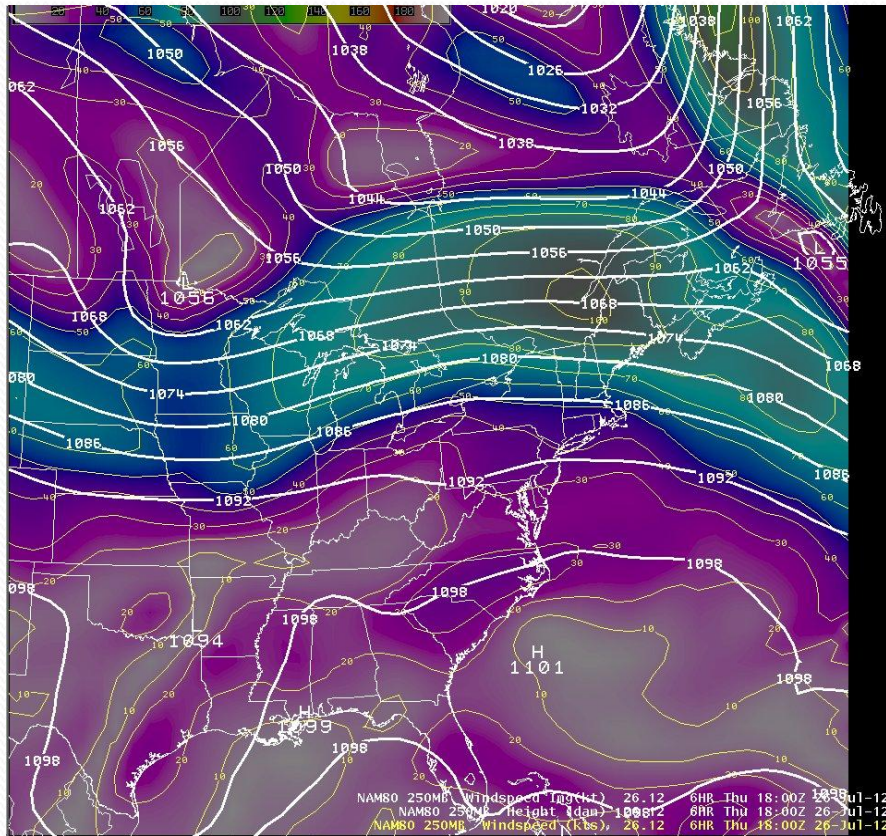
- A line of severe storms moved across southern NY and northern Pa on July 26, 2012
- 7 EF1 tornadoes were confirmed, with path lengths as long as 14 miles.
- 1 tornado tracked across downtown Elmira, with considerable damage.



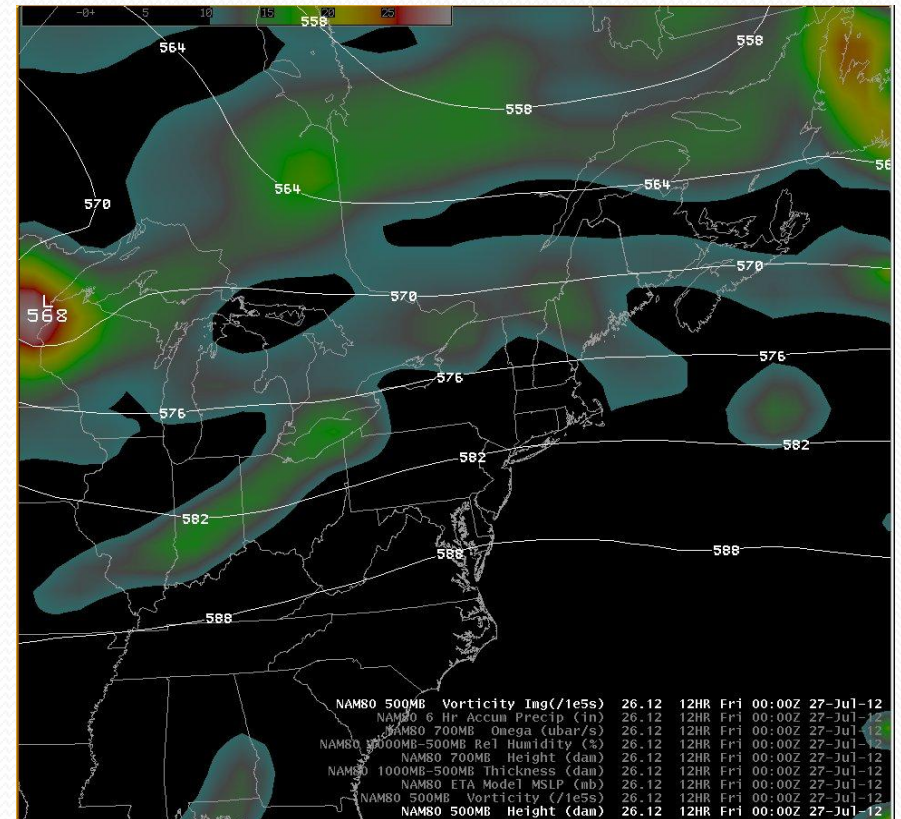
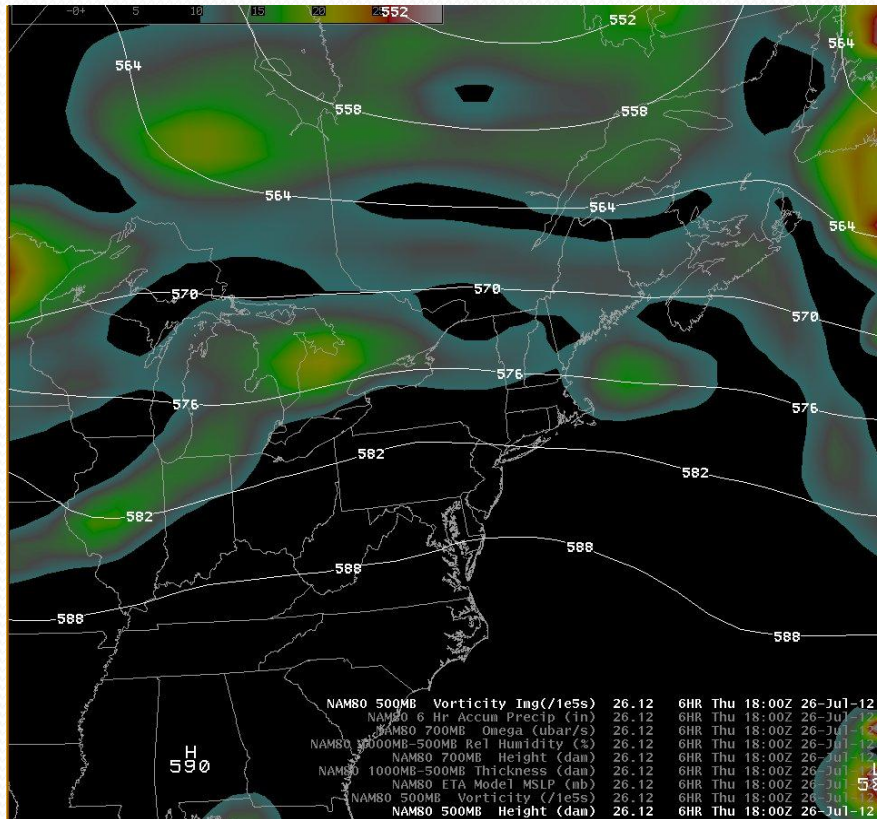
Outline

- Large-scale pattern
- Soundings / SPC analysis
- Comparison to other warm-season severe convective lines
- Summary / Conclusion

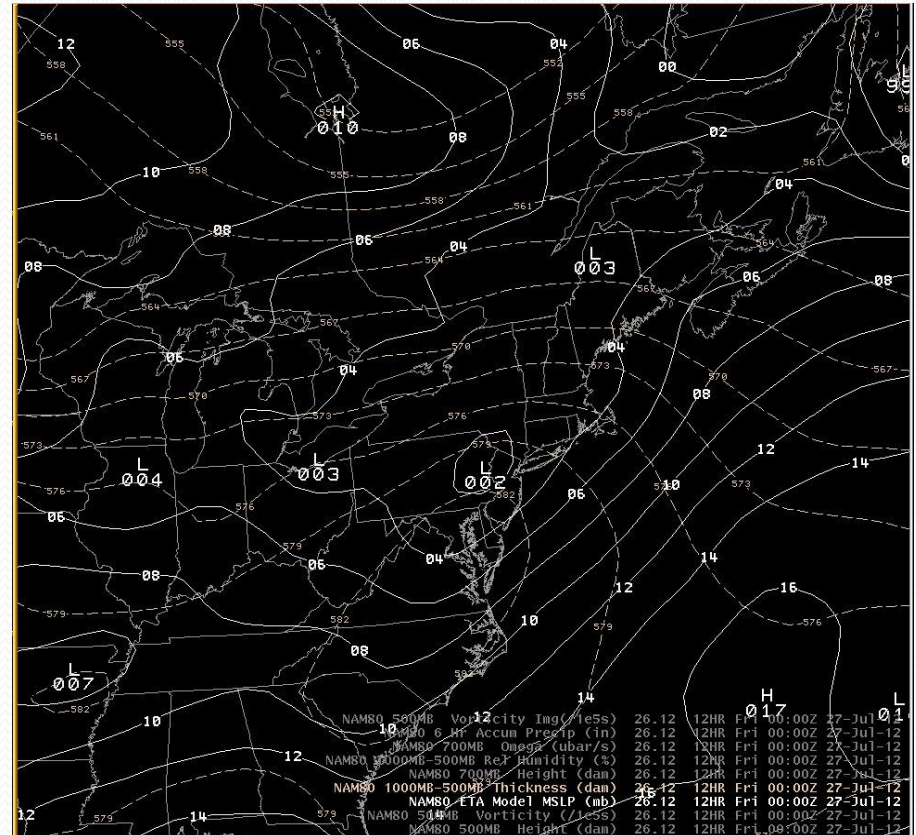
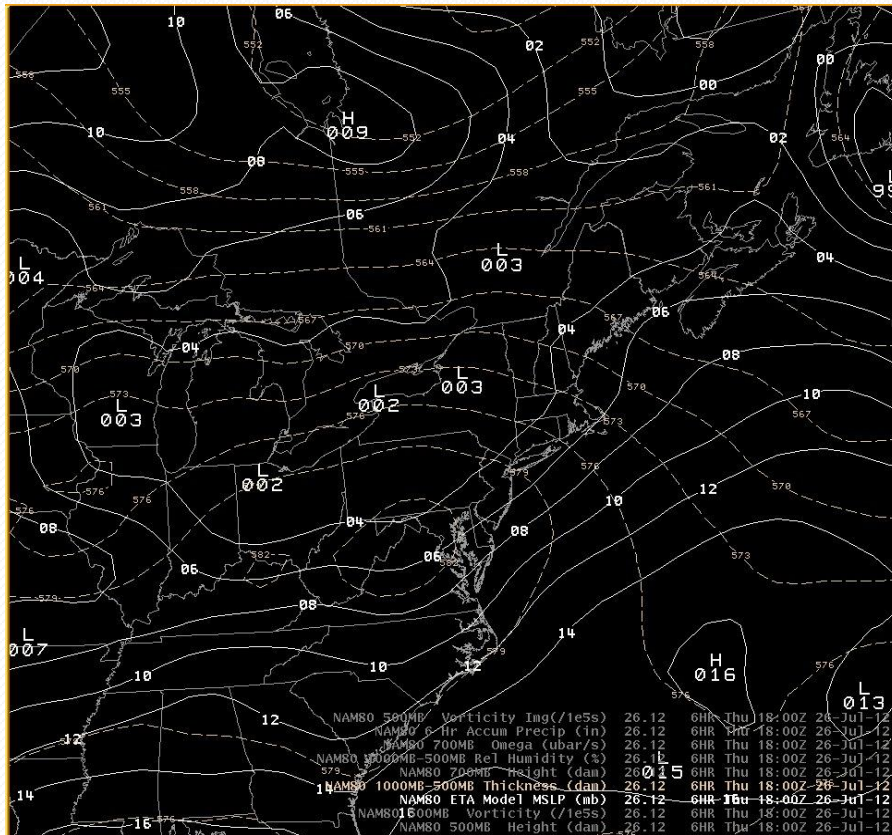
250 mb heights and wind



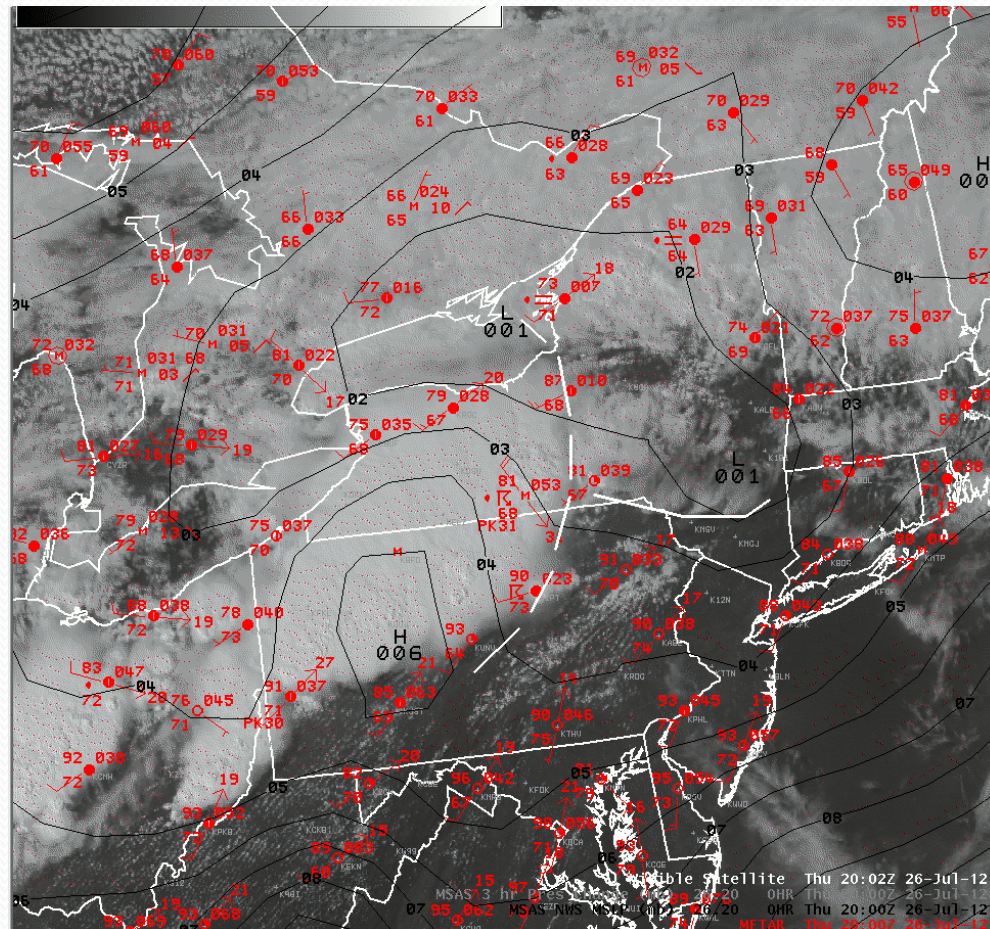
500 mb heights and vorticity



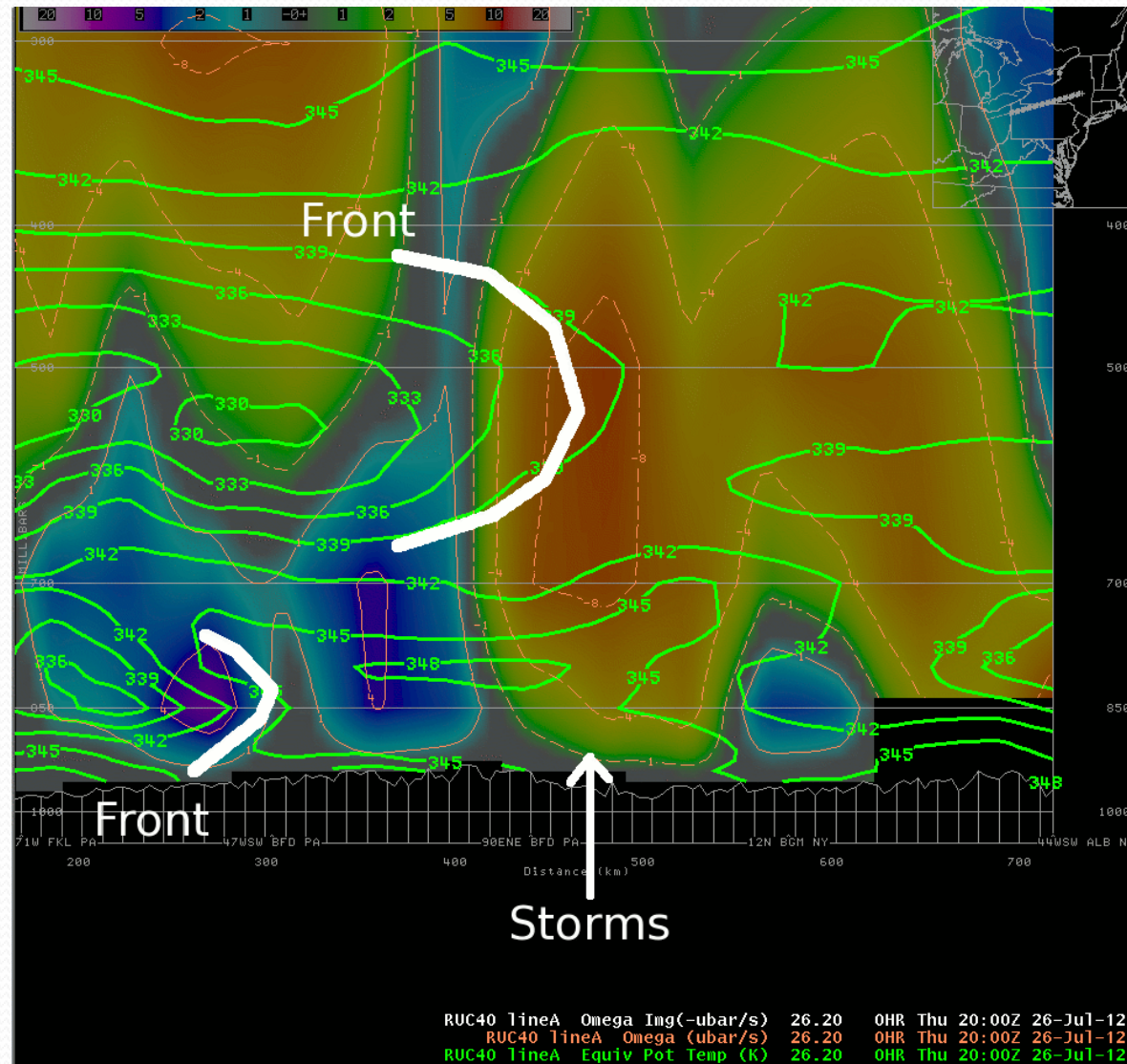
Sea-level pressure and thickness



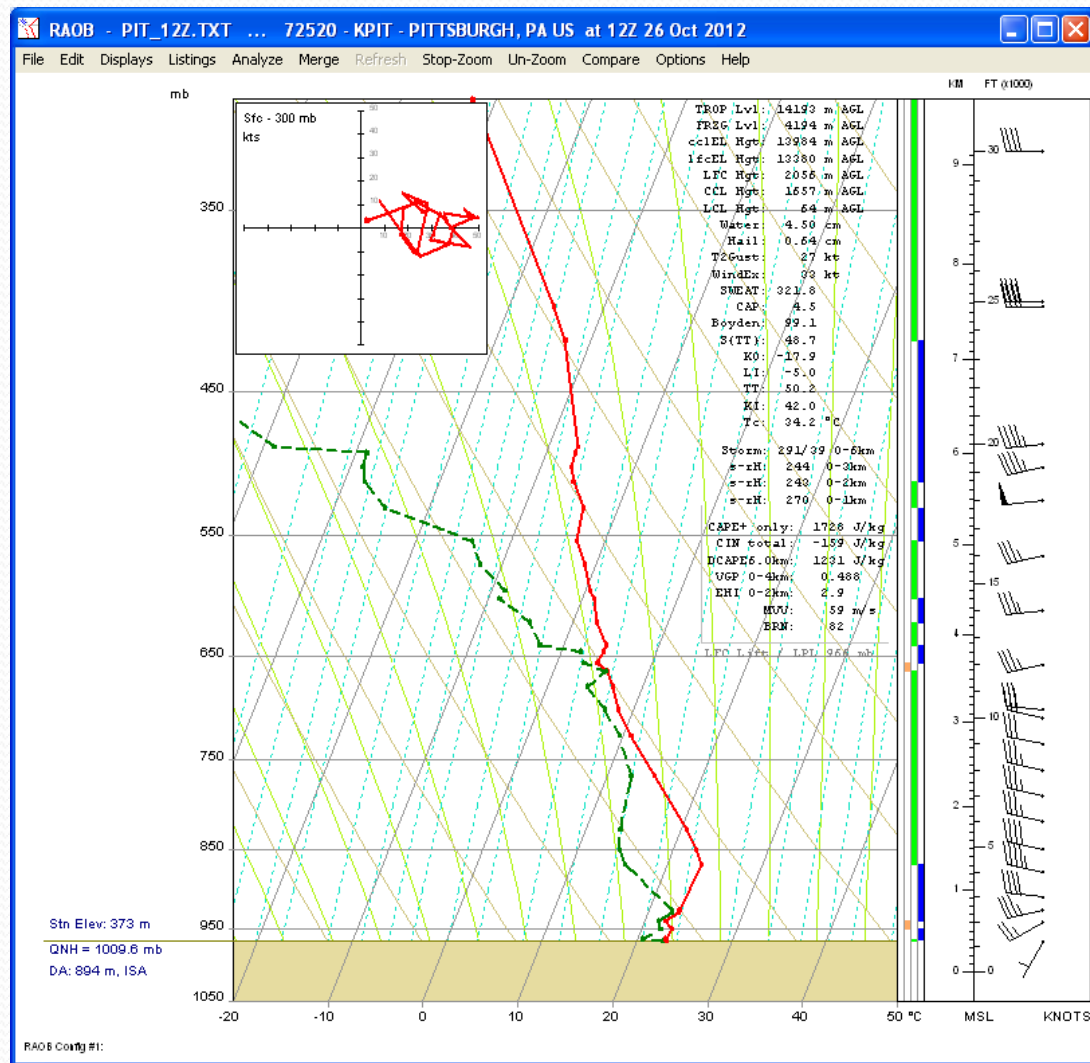
Surface plot and visible satellite – 20z



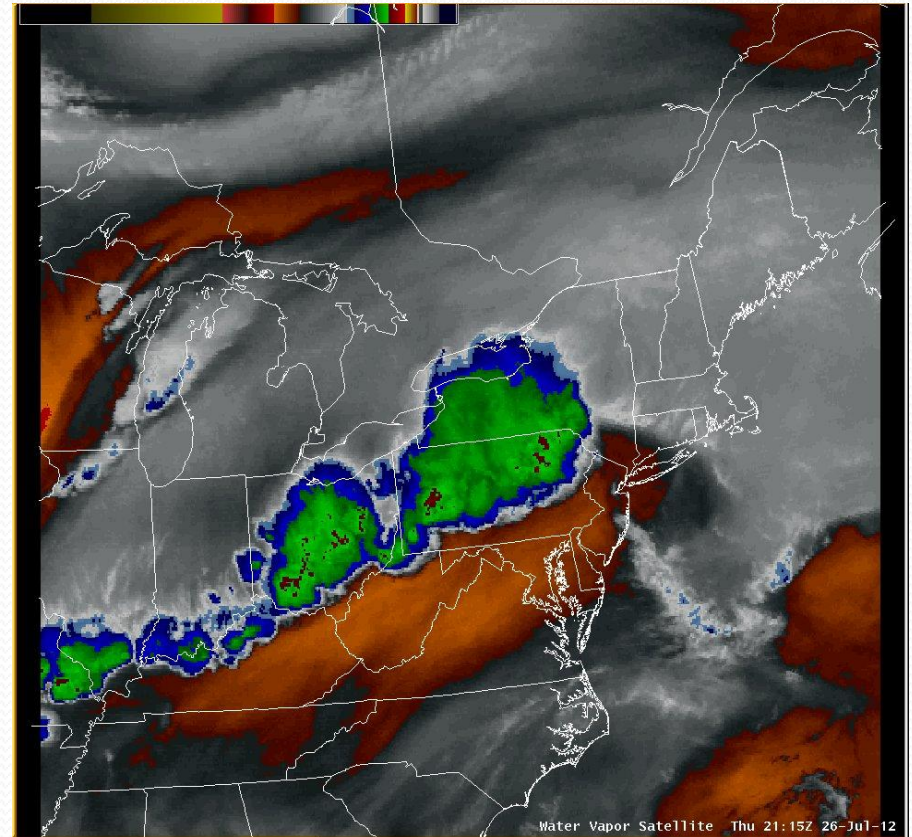
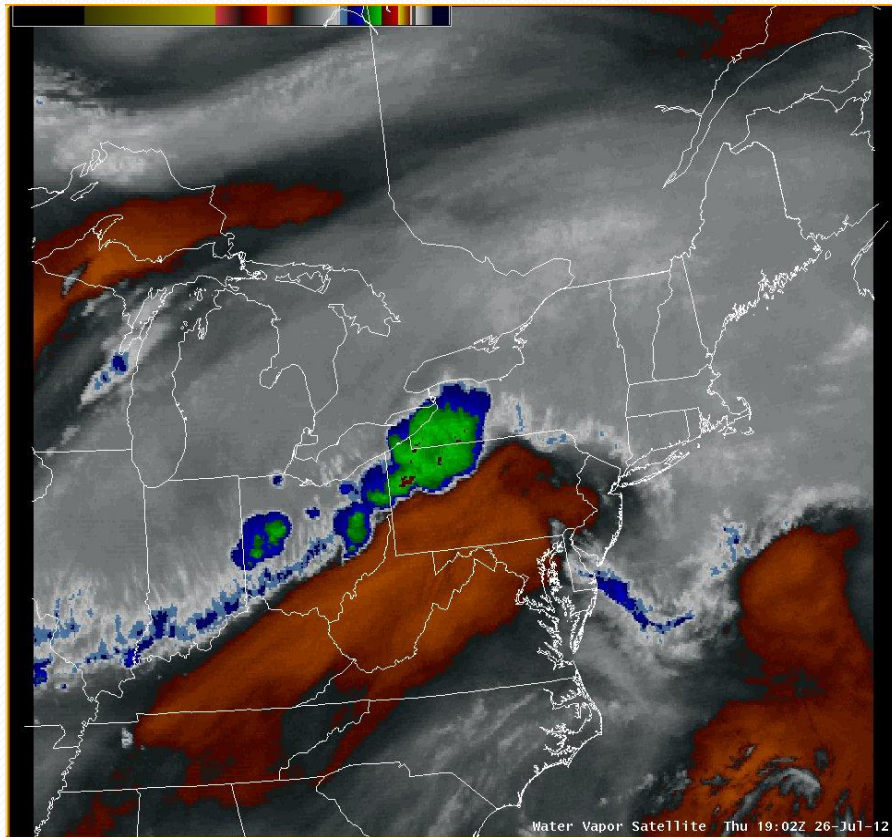
RUC Equivalent potential temperature and omega – 20z



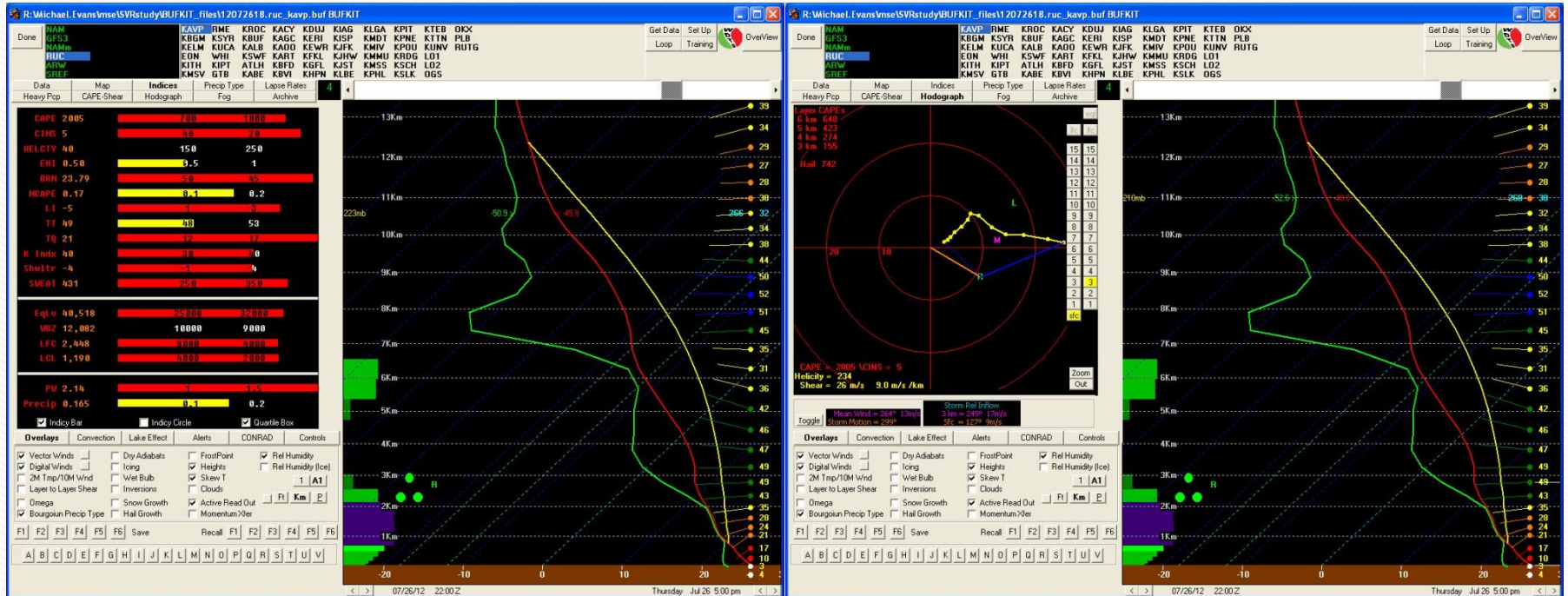
12z Pit sounding (elevated mixed layer)



Water vapor imagery



RUC BUFKIT data for AVP valid 22z

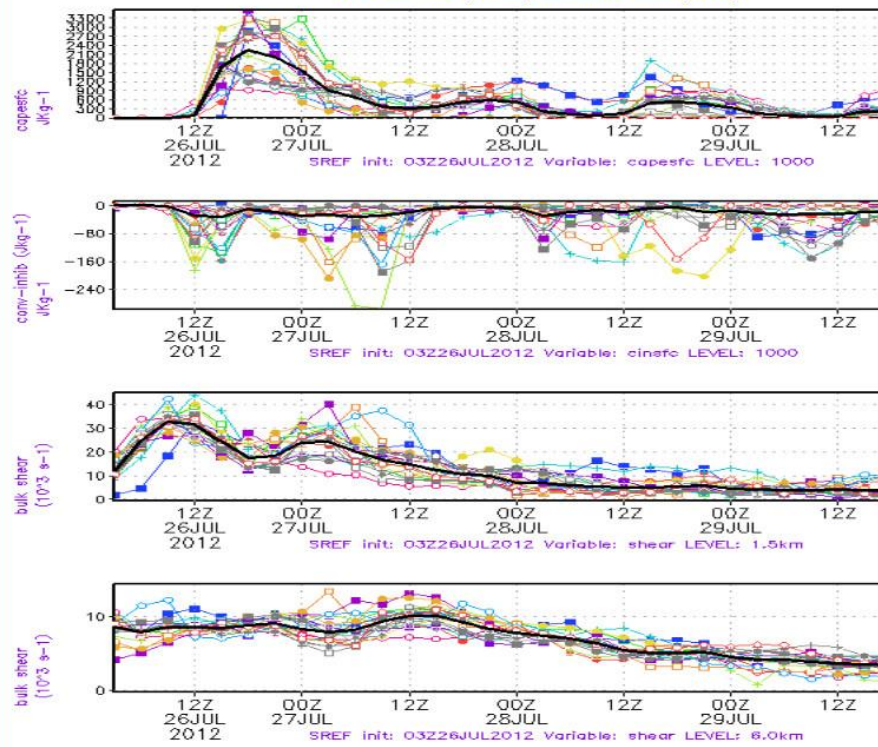


Convective parameter plumes

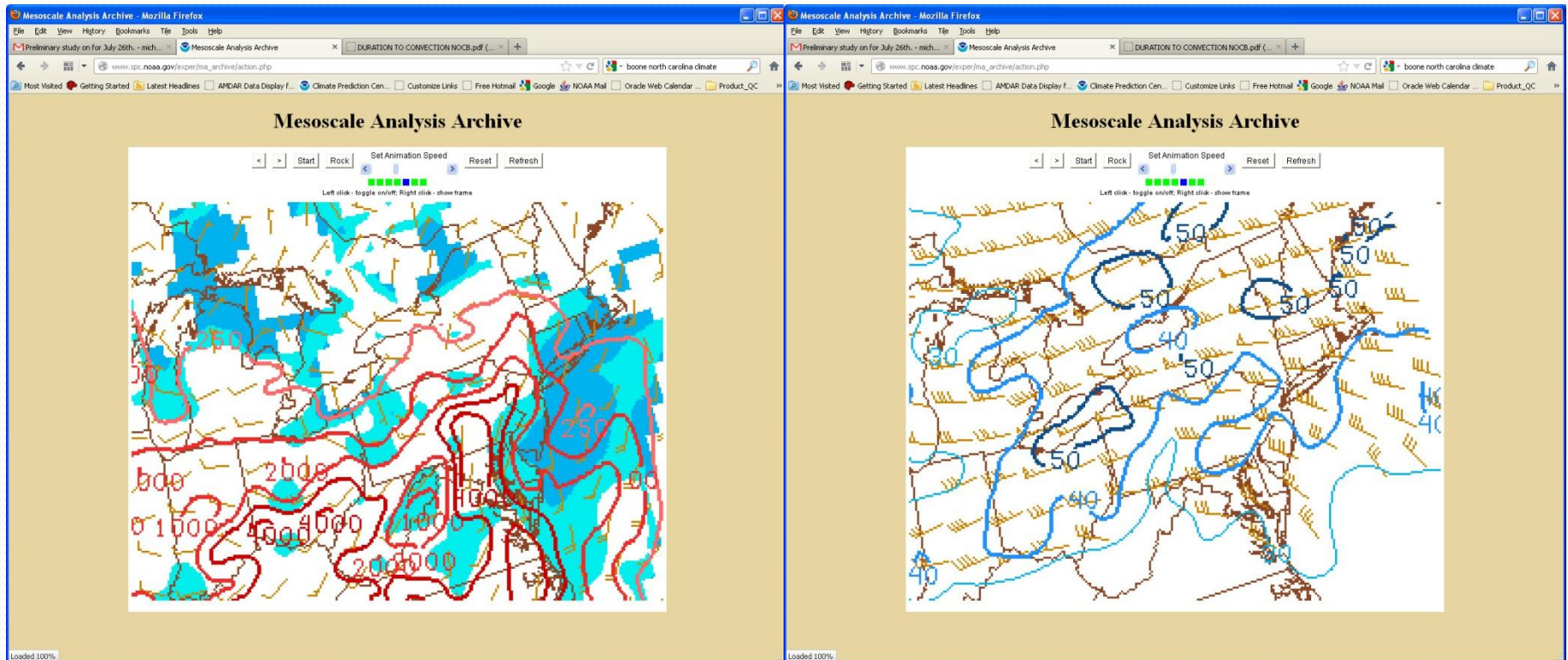
Select a System: some variables change by Ensemble Forecast System (EFS)

SREF 20120726 03 sref-cape NY Elmira

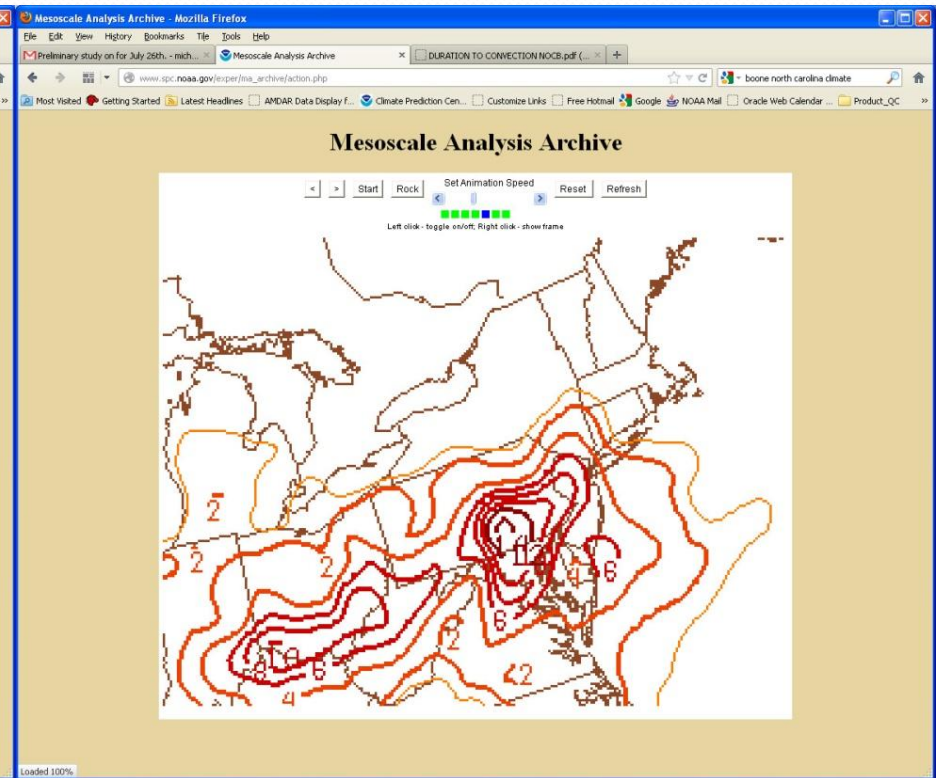
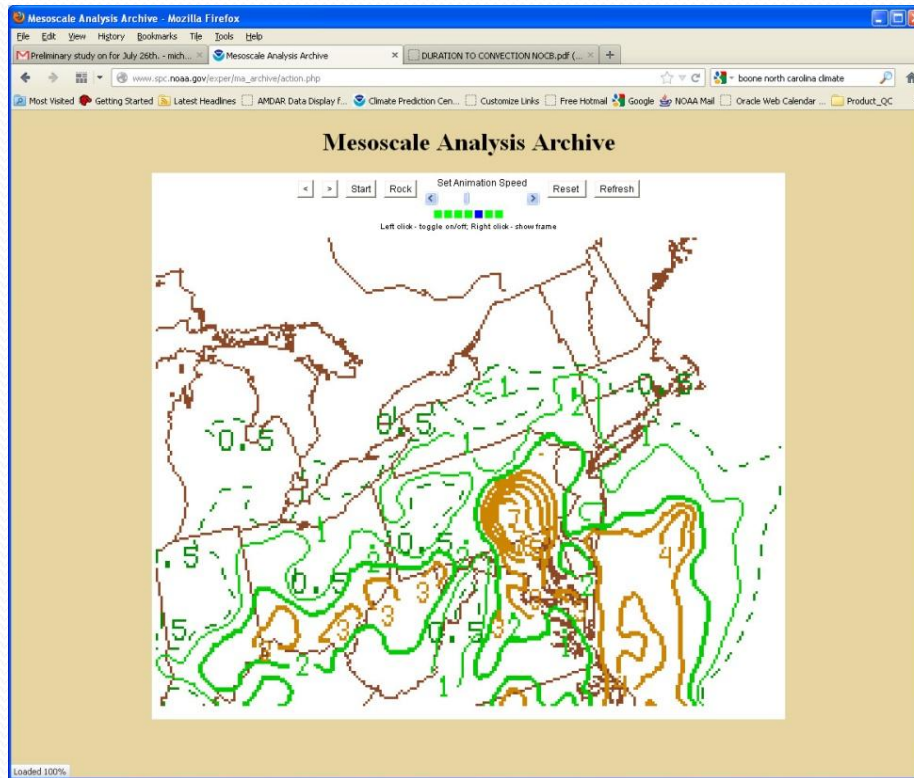
SREF Station Data for: Elmira, NY initialized: 03Z26JUL2012
Perturbations (colors) ensemble mean (black)



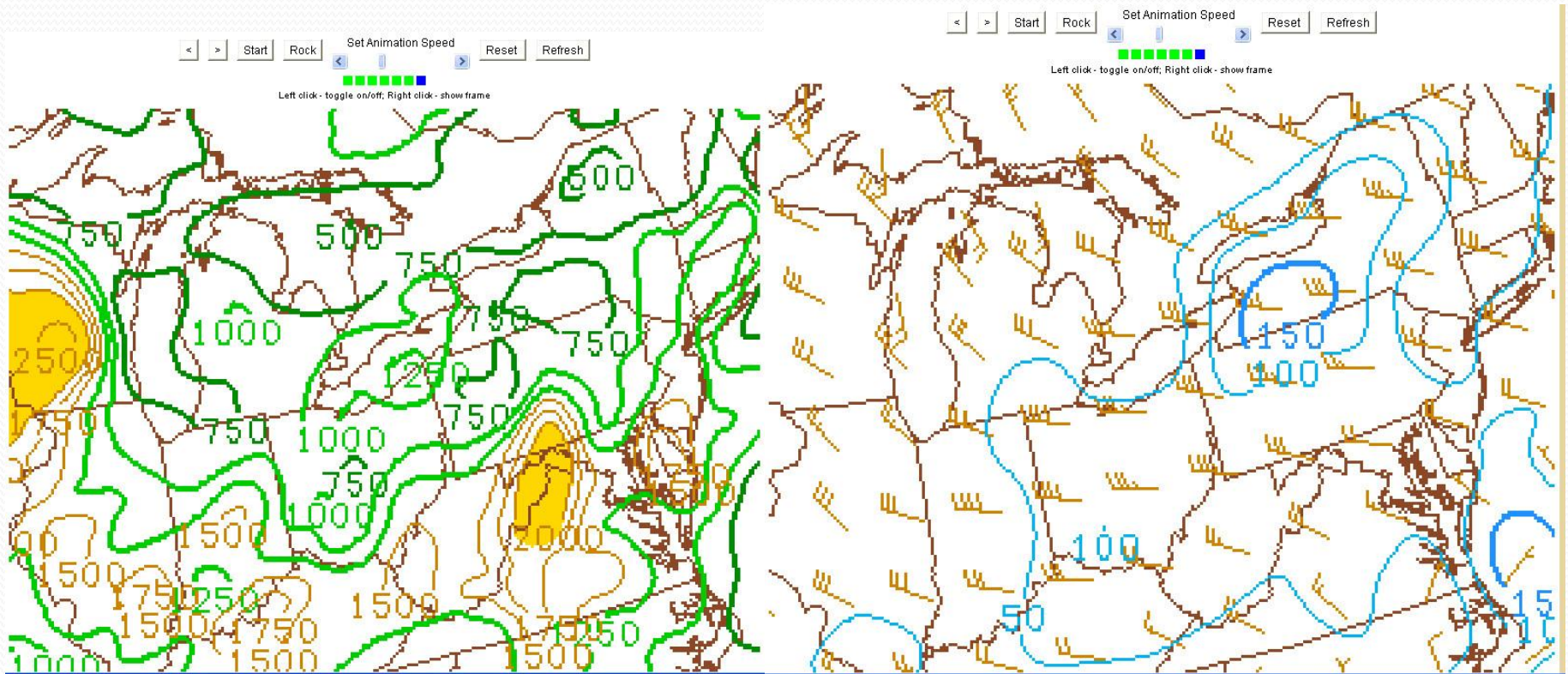
SPC CAPE / 0-6 km shear – 21z



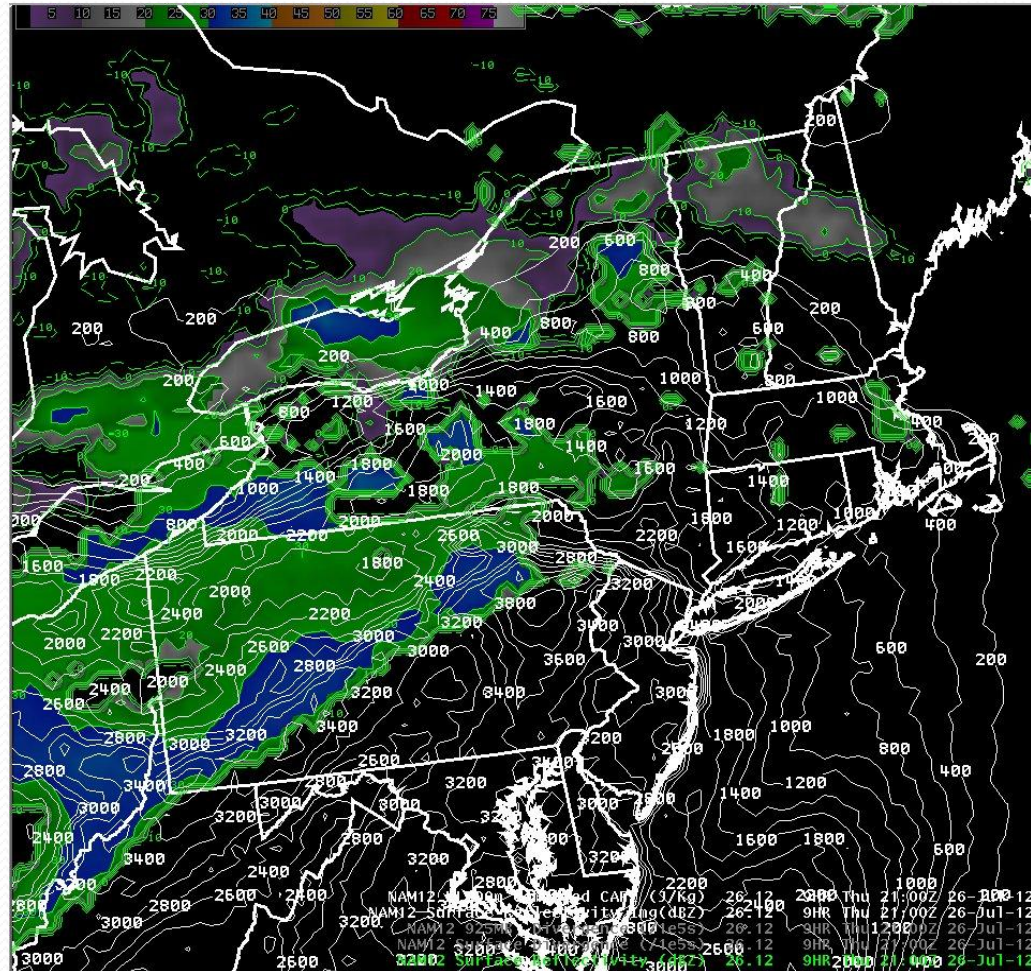
SPC – 0-3 km EHI and Derechlio composite – 21z



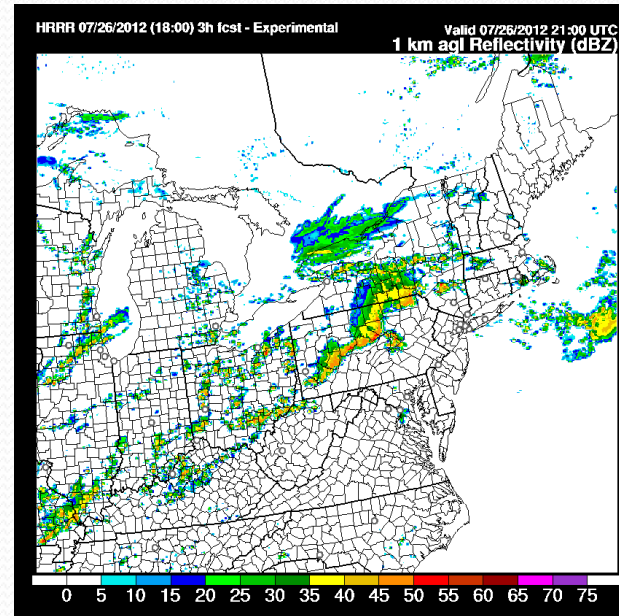
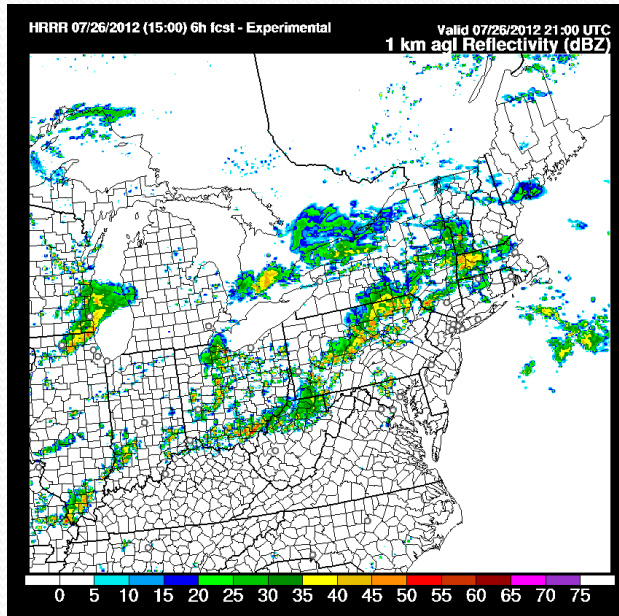
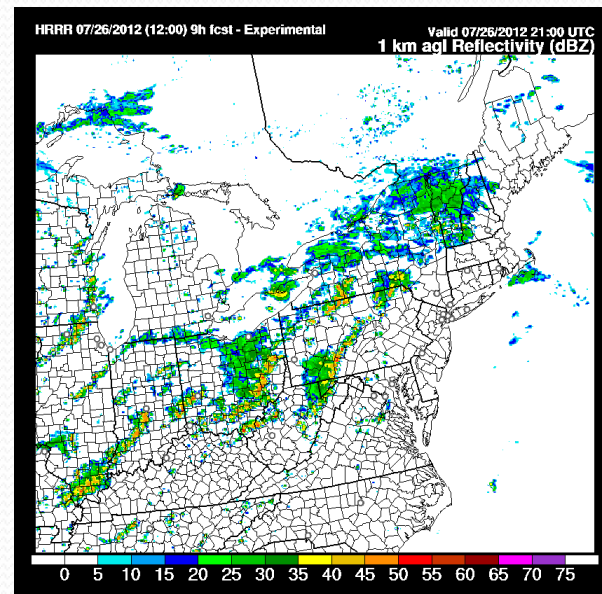
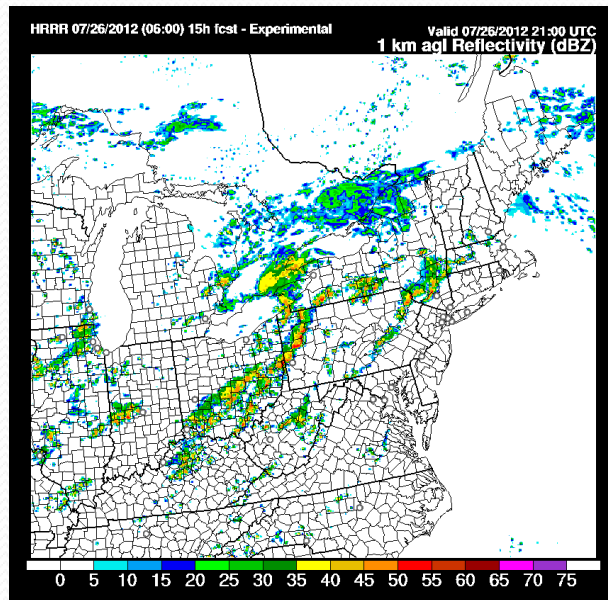
LCL height and 0-1 km helicity – 21z



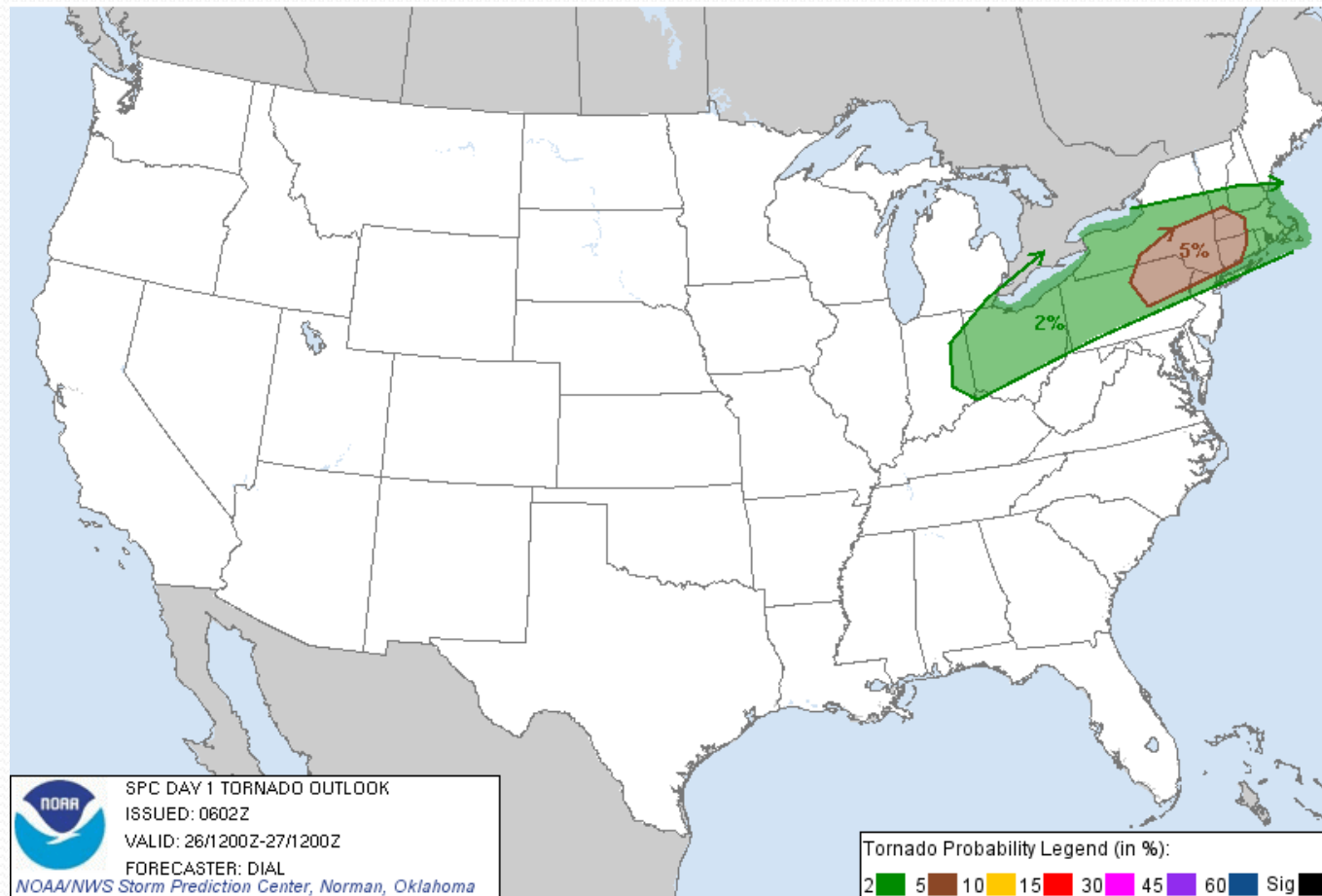
NAM 12 9 hour forecast reflectivity and MLCAPE



3 km HRRR model forecast reflectivity valid 21z



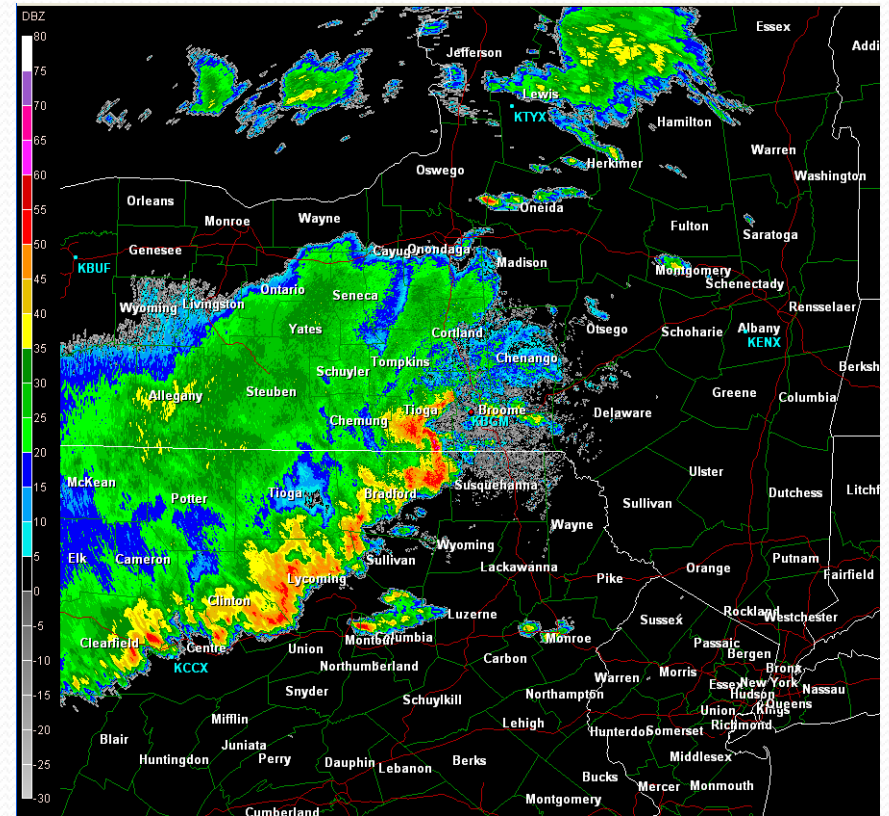
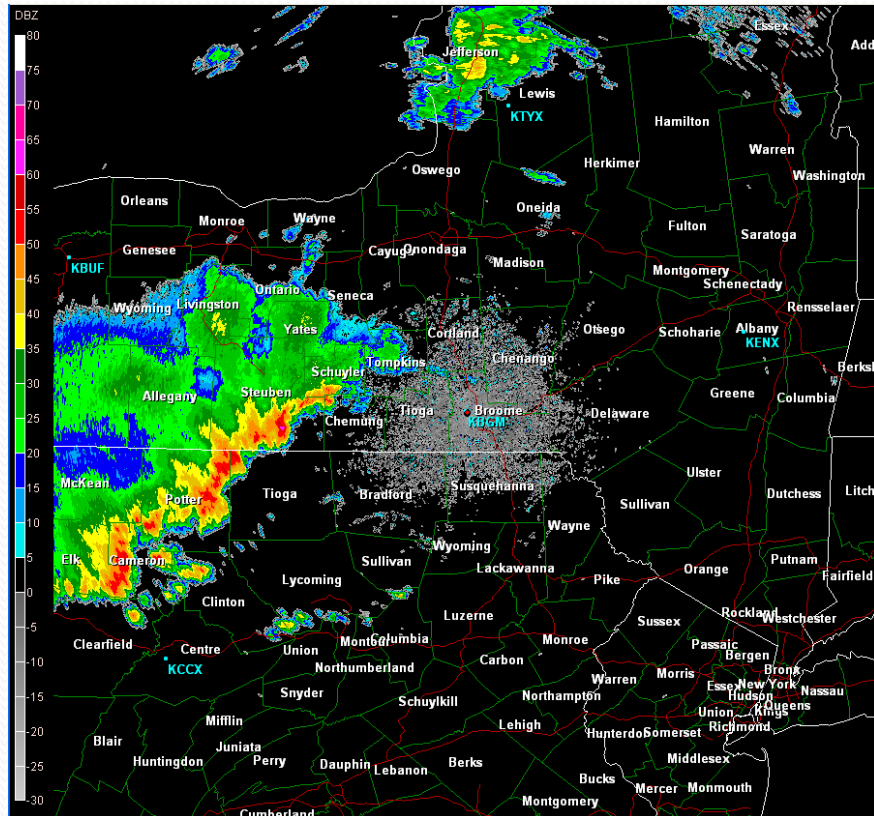
SPC guidance



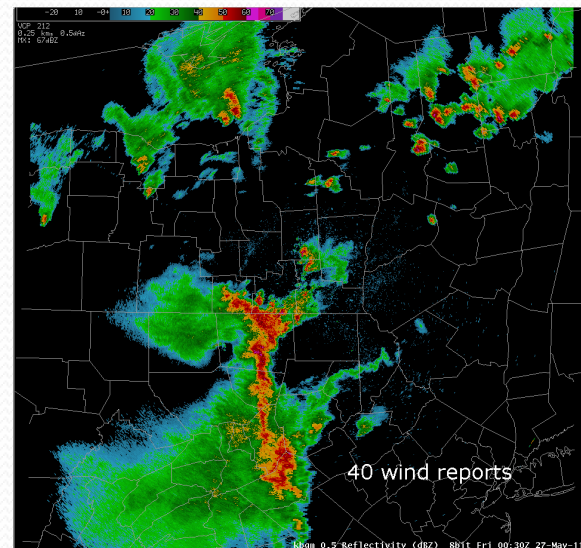
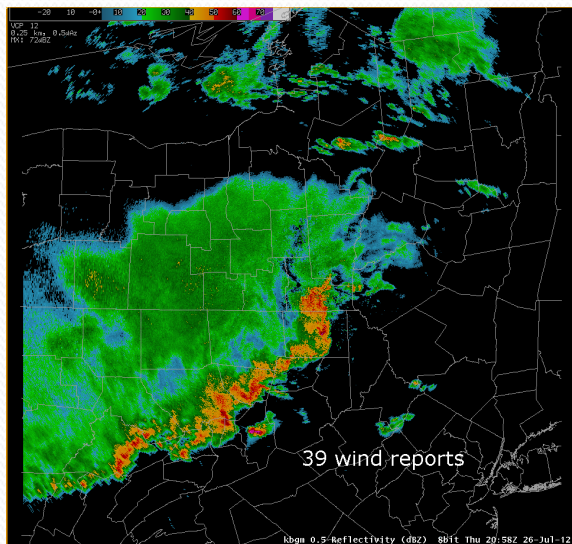
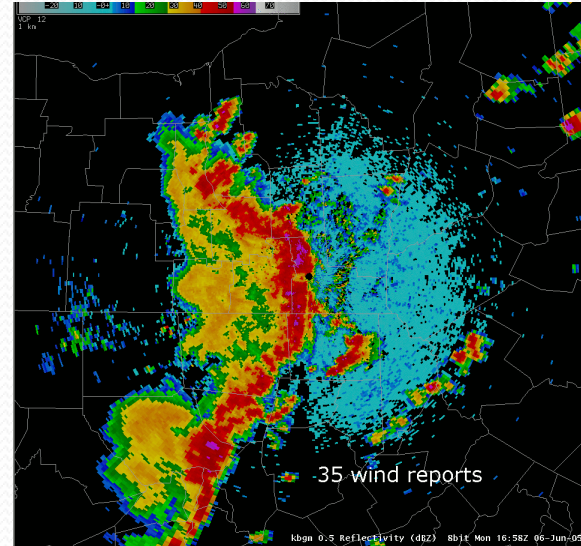
Environmental characteristics on July 26th, 2012

- Southern edge of the westerlies.
- Zonal mid-level flow / weak height falls.
- Weak low pressure / lee trough / front aloft
- Instability gradient / unstable with elevated mixed layer over Pa
- Large shear

Radar reflectivity – 7/26



Previous warm season severe lines



Rear-inflow jet conceptual model

ic1-lesson4_color_articulate - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address http://198.206.35.217/intranet/training/awoc/ICSvr1/ICSvr1-lesson4/ic1-lesson4_color_articulate/player.html

WDTB eLearning

Presenter: Brad Grant
Meteorologist Instructor

Email Bio Search

Outline Thumbnails

- 5. Morphology and Evolution
- 6. Factors Influencing Evolution of
- 7. Effects of Cloud Bearing Wind
- 8. Effects of Storm-Relative Flow
- 9. Cold Pool Effects RKN Theory
- 10. Cold Pool Effects Movement of
- 11. Role of Rear-Inflow Jet (RIJ)
- 12. RIJ Schematic
- 13. Instability Effects
- 14. Boundary Interactions

Title: Role of Rear-Inflow Jet (RIJ)


Time: 00:42 / 00:49

Slide: 11 of 18

Role of Rear-Inflow Jet (RIJ)

- Produced by perturbation hydrostatic pressure gradients from buoyancy differences across the updraft, esp. in anvil
- Rear to front flow orientation
- Modulated by strength of cold pool and shear

Bigger CAPE = stronger RIJ

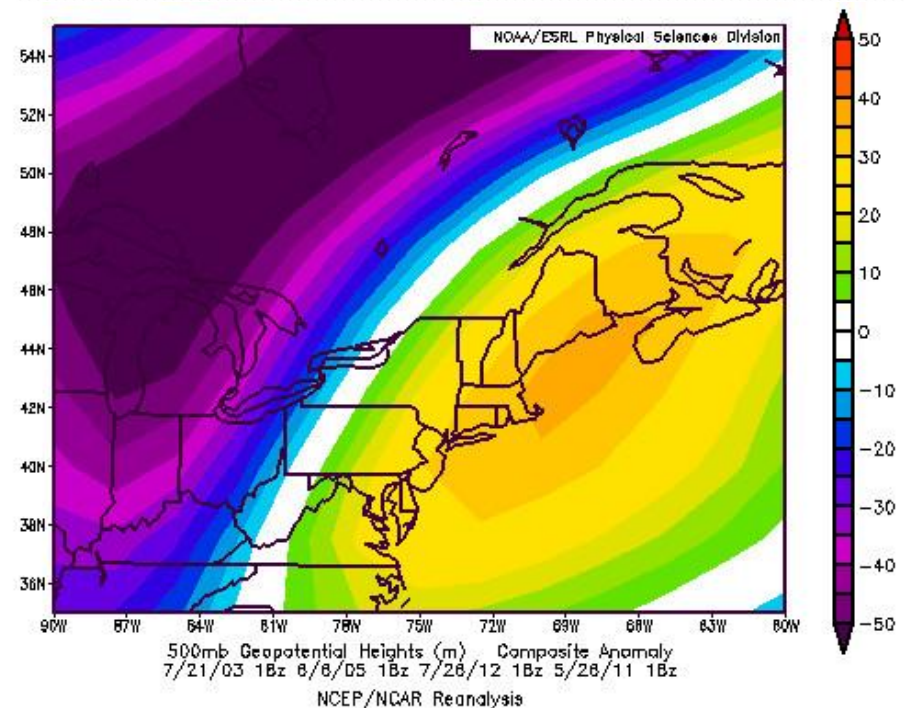
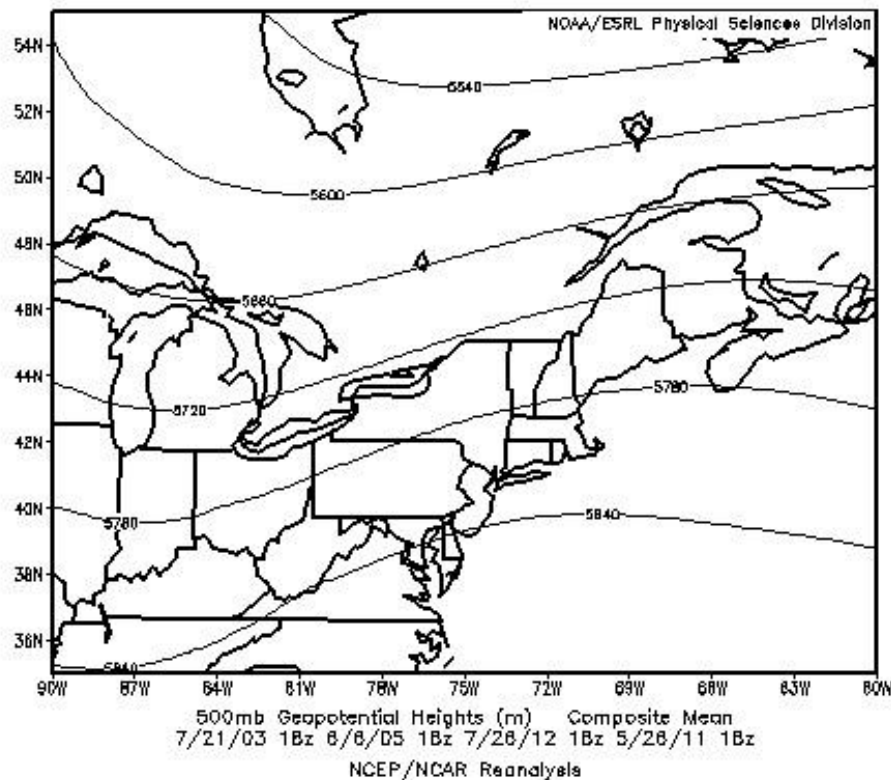


POWERED BY articulate™

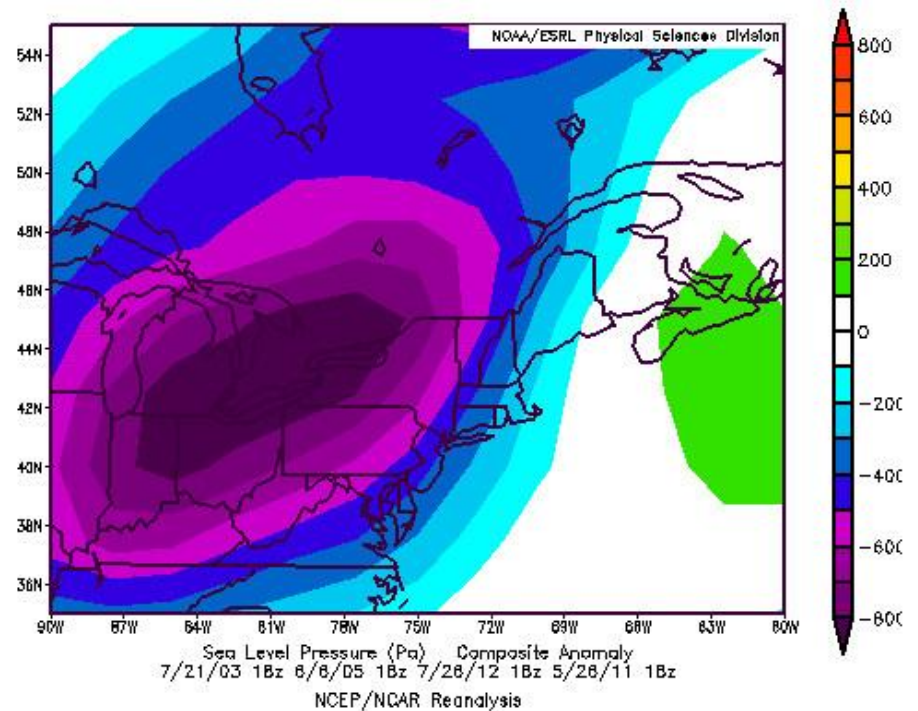
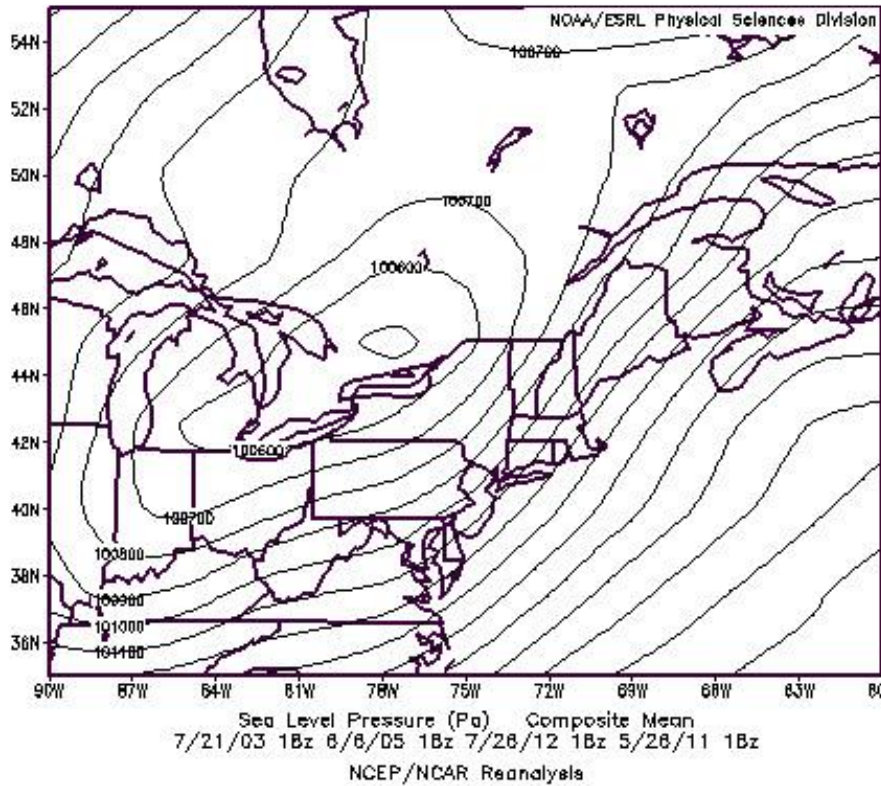
Slide Notes Reference Bookmark Forward My Notes

Done Internet

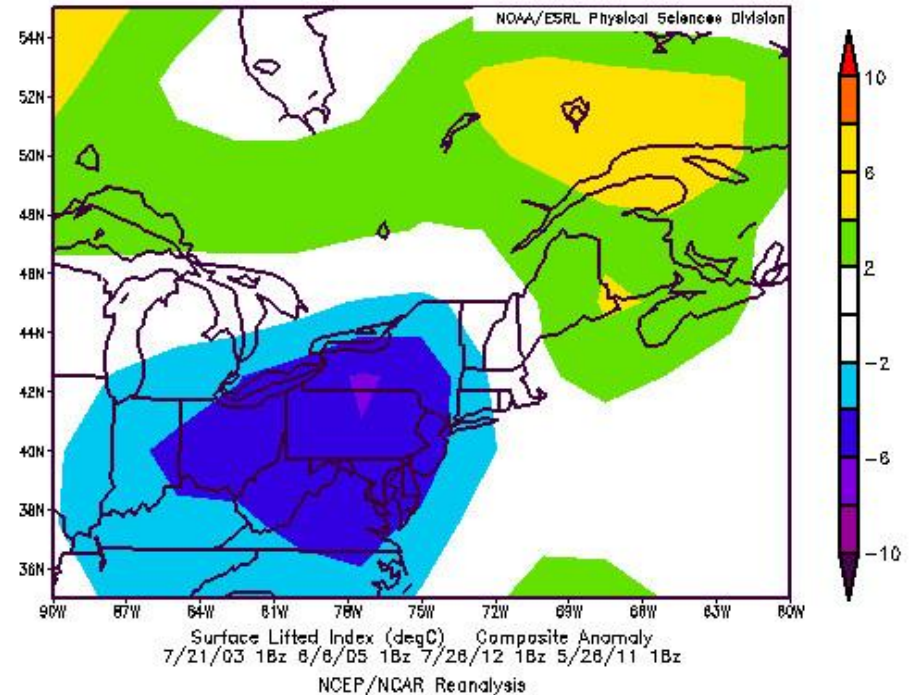
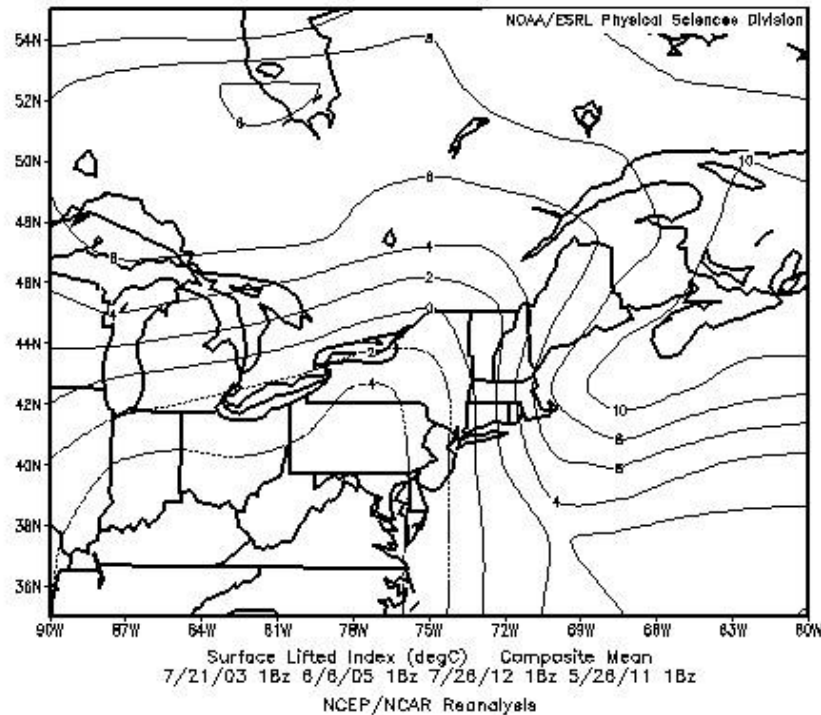
500 mb heights



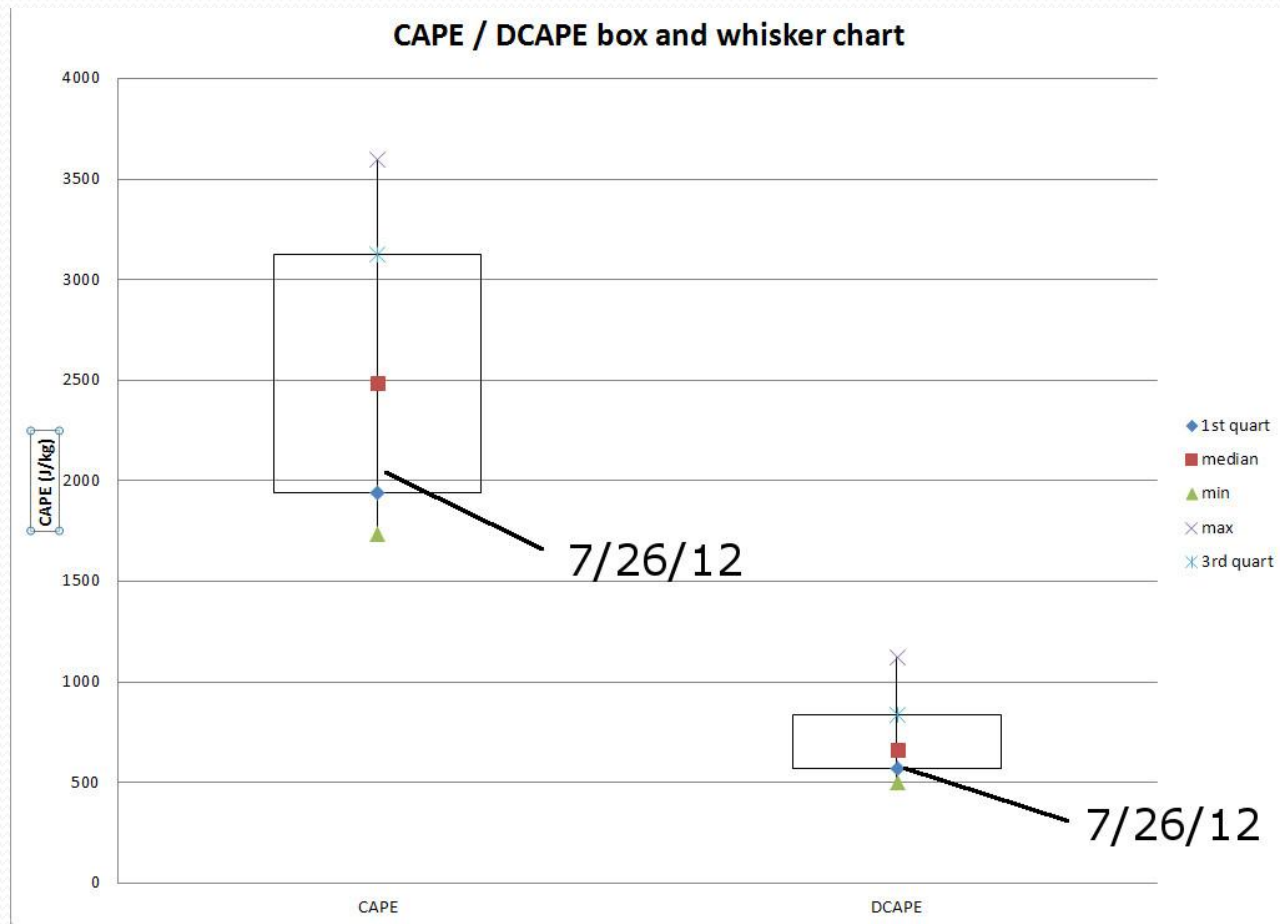
Composite sea-level pressure



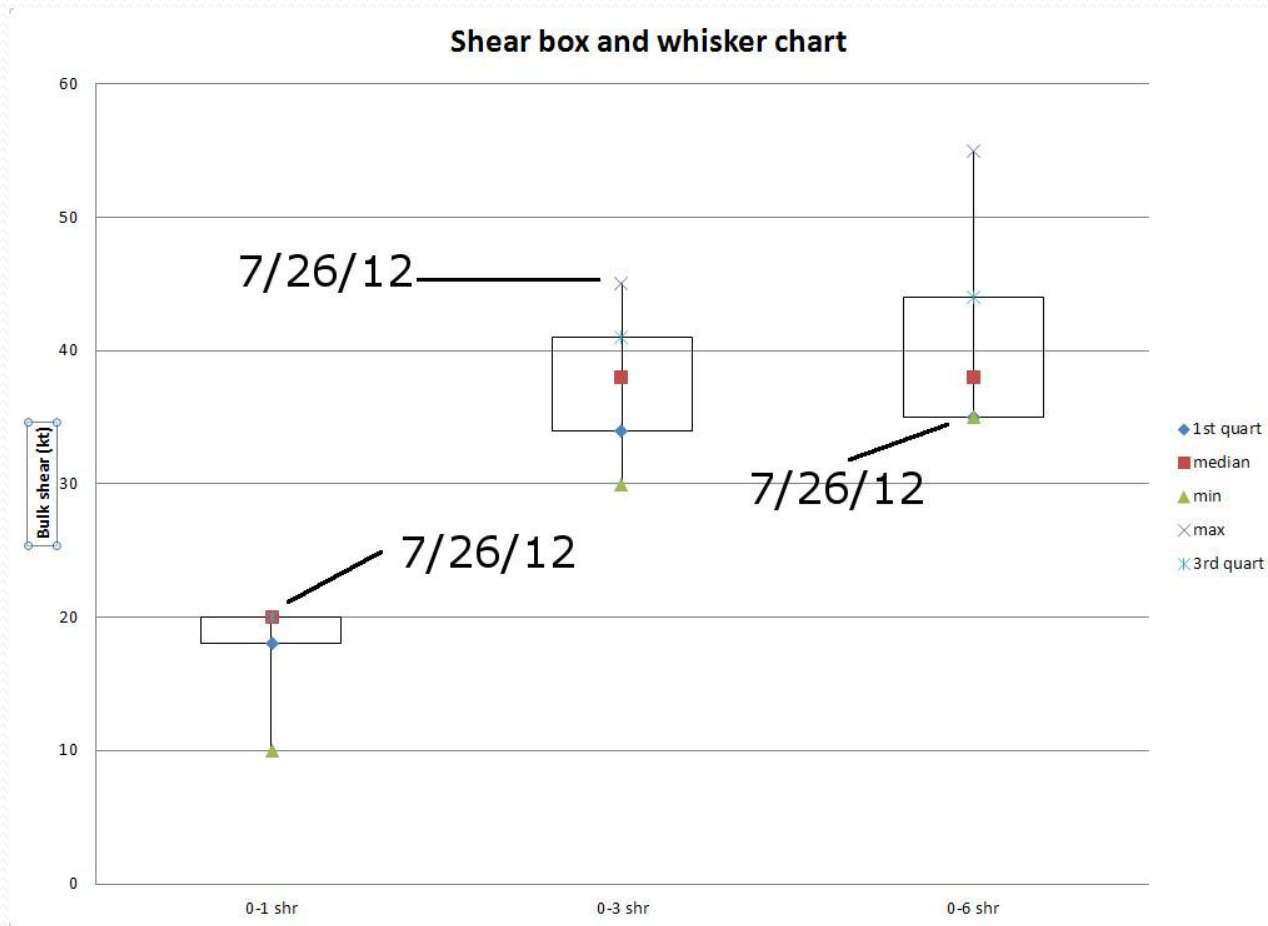
Composite Lifted Index



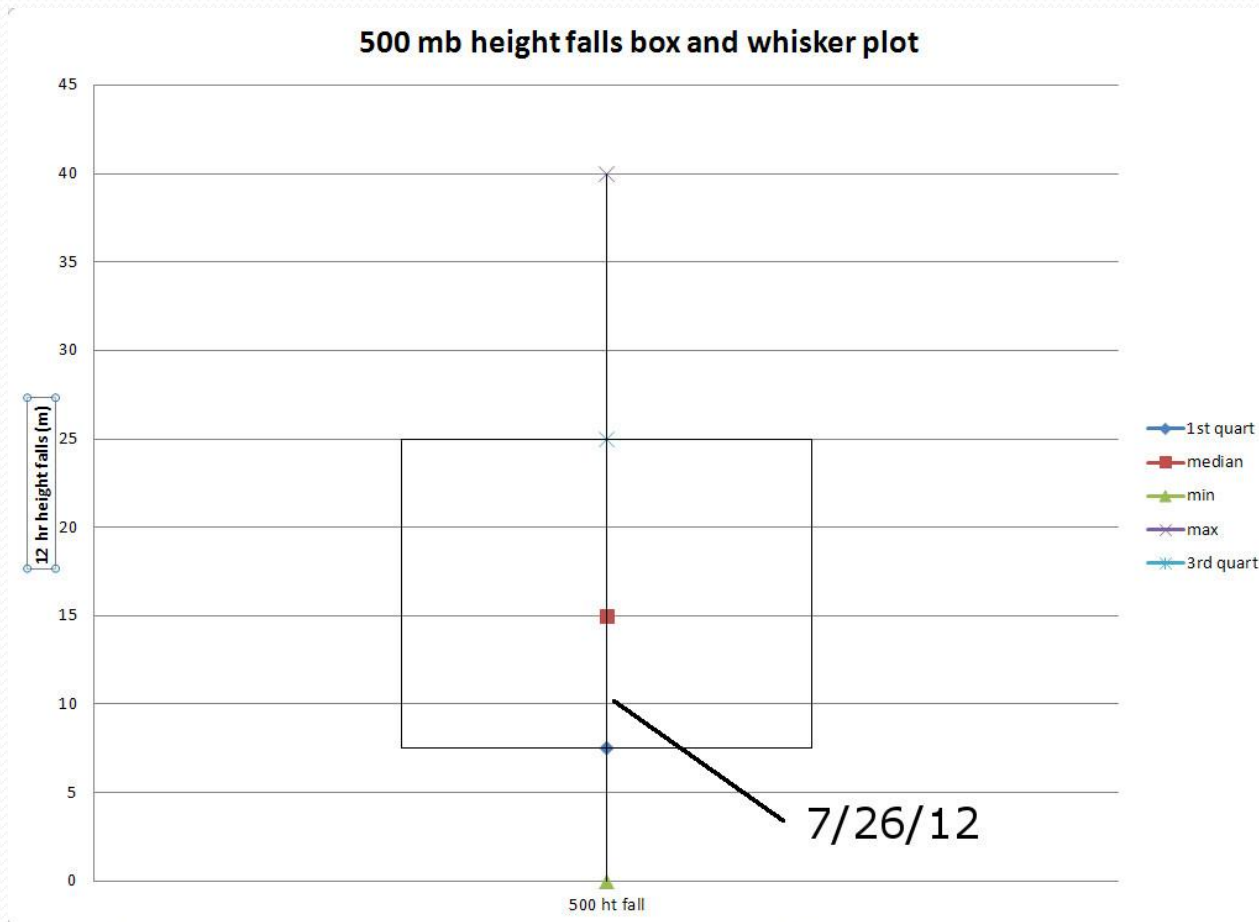
Box and whisker CAPE / DCAPE



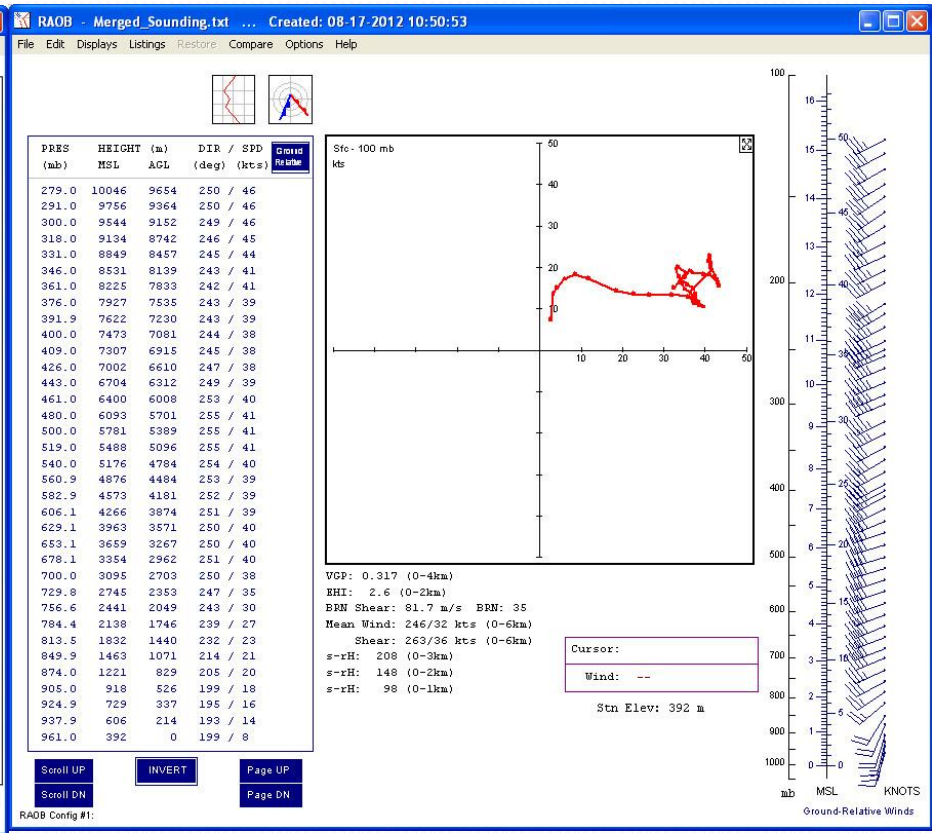
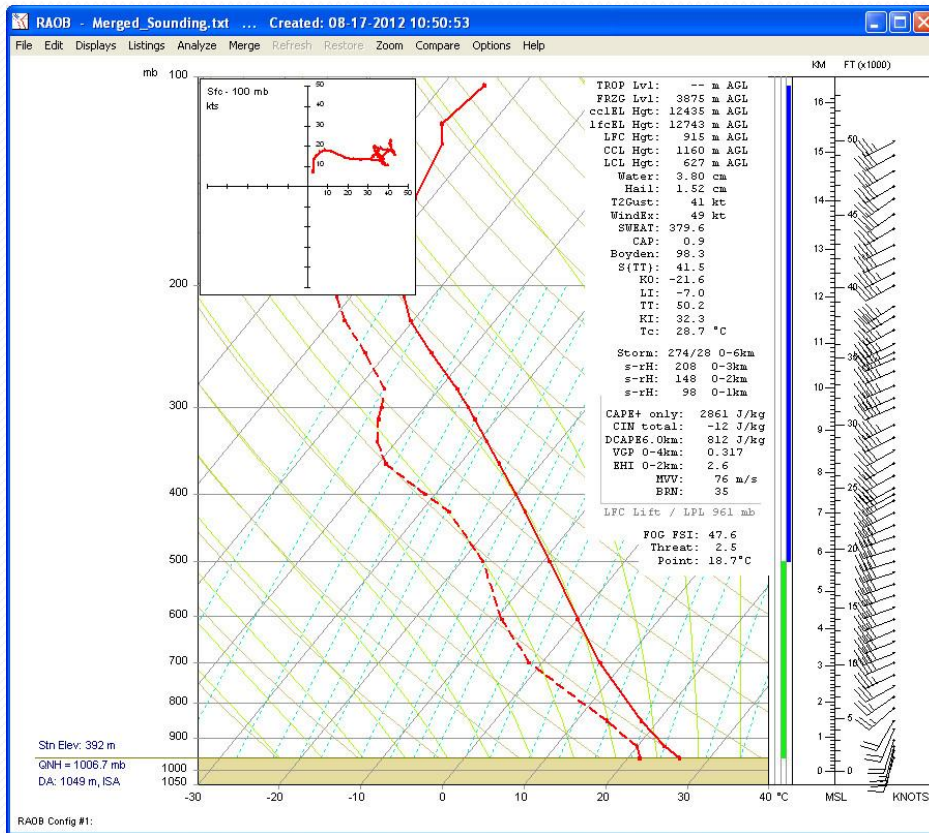
Box and whisker shear



Box and whisker 500 mb height falls



Composite sounding



Similarities to other major warm season convective line events:

- Modest mid-level flow amplification: weak trough over the Great Lakes / modest height falls.
- Surface low pressure over the Great Lakes.
- Highly unstable over the mid-Atlantic region.
- Strong shear, especially from 0-3 km.